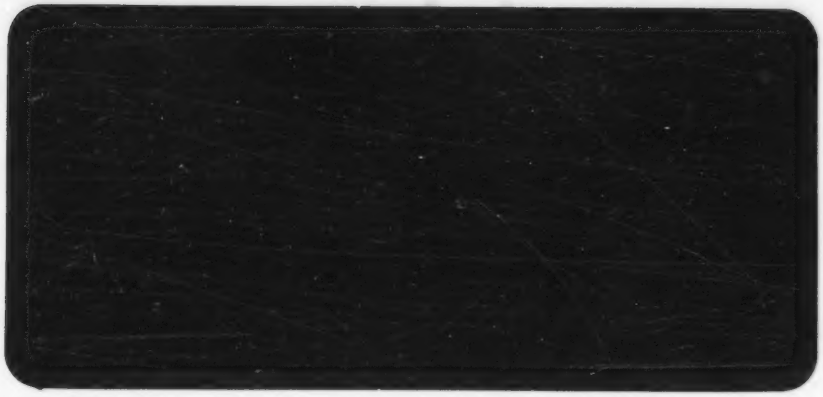
Working Paper



Department of Finance

Fiscal Policy and Economic Analysis Branch

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Regional Productivity Convergence In Canada

by
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ABSTRACT

In this paper, an extension of Coulombe and Lee (1994) we estimate the convergence speed, and compare the growth patterns, of productivity in the ten Canadian provinces over the 1966-1992 period. Output per worker and per hour work are relevant measures to test for changes in regional disparities since, in a neo-classical framework where factors are free to move, the productive ability of factors should converge in all regions of an economic and political union, despite initial differences in endowments. Our empirical analysis suggests that measures of regional output per worker and output per hour have been converging faster than measures of regional per capita income and output. It then follows that the continued existence of large disparities in per capita incomes must be related to large differentials in unemployment rates across regions. Thus there is a need to facilitate adjustments in the labour market by reducing impediments to interprovincial labour mobility.

RÉSUMÉ

Dans cette étude, qui est une extension de celle de Coulombe et Lee (1994), nous estimons la vitesse de convergence et analysons le profil de croissance de la productivité dans les dix provinces canadiennes sur la période 1966-1992. Les données sur la production par tête et par heure travaillée sont des mesures pertinentes pour l'étude de l'évolution des disparités régionales, car, dans un cadre néo-classique caractérisé par la mobilité des facteurs, la capacité productive des facteurs devrait converger dans toutes les régions d'une union économique et politique, et cela en dépit de divergences initiales en dotation. Il ressort de notre analyse empirique que les différentes mesures de productivité ont convergé plus rapidement que les mesures de production et de revenu par tête. Il s'ensuit que la persistance d'importantes disparités régionales devrait être imputée à la rémanence des écarts de taux de chômage régionaux. Les mesures politiques adéquates pour tenter de corriger les disparités régionales devraient donc viser à minimiser les entraves à la mobilité des facteurs au pays.

The revival of growth theory in the last half of the 1980s has initiated a harvest of empirical studies on the convergence of per capita output across countries/regions. In the neo-classical growth framework, the bench-mark from the 1950s to the 1980s, convergence was viewed as a transitional dynamics toward steady-states of countries/regions with identical technology and preferences. In the framework of endogenous growth models that appeared in the 1980s with the pioneering work of Romer (1986) and Lucas (1988), the issue of convergence across countries/regions emerges since both convergence and divergence can be observed depending on groups of countries/regions analyzed. Growth being endogenous and potentially affected by the choice of institutions, trade patterns, and economic policies, two countries/regions can experience different growth rates in these models. One key question analyzed by Lucas (1988) is whether increased trade and economic integration is likely to favour convergence or divergence of output per capita across different countries/regions. The answer is not clear and both cases are possible depending upon initial conditions, comparative advantages, preferences and technologies. In this context, it is interesting to compare relative growth patterns of regions of the same country with those of different countries.

Regional disparities in living standards, productivity and unemployment rates in Canada have been consistently observed and many studies have been carried out to understand these issues[1]. In a recent paper, Coulombe and Lee (1994) found that there is evidence of convergence in a variety of provincial per capita income/output measures in Canada only since the 1960s. Prior to World War II, divergence or, at least the absence of a converging pattern were generally observed. The analysis indicates that the speed of convergence since the 1960s is relatively slow when compared with the convergence speed of U.S. states and countries of the European community. Two sets of reasons can be used to explain these results. First, following an endogenous growth framework or any of the structural approaches used to explain the absence of convergence in economic development[2], one would argue that those stylized facts simply reflect the differences in industrial structures

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1. For example, Auer (1979), Coulombe and Lee (1993), Day (1989), Denny and Fuss (1982) and Norcliffe (1988). For a survey, see Mansell and Copithorne (1986).

2. Like the Staple theory, the growth pole approach or the core periphery model. On this, refer to our discussion in Coulombe and Lee (1993).

and that trade of goods and flows of factors between regions observed in an economic and political union do not by them-selves equalize per capita output. Second, following a neo-classical framework, one would argue that the converging forces produced by market adjustments have been neutralized by fiscal/social policies that have prevented factor mobilities. Thus, the results we found for the pre-world-war II period and for the post 1960s do not authorize specific policy recommendation since divergent stories can be told to explain those stylized facts. To provide a hint for policy prescriptions, more refined results are needed and this paper makes one step in this direction.

In this paper, we extend the analysis of Coulombe and Lee (1994) by estimating convergence speed of labour productivity in the ten Canadian provinces. Our study shows that regional differences in output per worker and output per hour have been converging faster than per capita incomes.[3] In addition, the dispersion of output/income per capita is much larger than the dispersion of output/income per worker or per hour. Furthermore, there is no evidence of convergence in unemployment rates. From the policy prescriptions point of view, these results suggest that convergence in per capita incomes across Canadian regions could be accelerated by removing impediments to labour market adjustments and inter-regional migration that come out of the actual unemployment insurance scheme. On the other hand, equalization payments that allow residents of poor regions to have an equal access to education would be viewed as a policy that does not restrain convergence across Canadian regions.

The paper is divided into five sections. In the first one, we describe some characteristics of the endogenous growth models that will be used for the normative part of

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3. Auer (1979) also finds a greater dispersion in income per capita than income per worker. Denny and Fuss on the other hand look at regional total factor productivity in the manufacturing sector for the 1961-1977 period. They in turn find greater regional differences in labour productivity than total factor productivity. They therefore argue that differences in factor intensity are likely to be responsible for the regional differences in labour productivity levels. They also find that the differences in total factor productivity levels in the 1970s are smaller than those for the 1960s.

this paper. The following section discusses the methodology used in the study. Section 3 describes the data and Section 4 presents the results. The last section concludes.

1. Growth Theories and Convergence

New growth theories and the neo-classical growth model can be used to explain more or less the same stylized facts. They provide however alternative explanations of those facts and lead to different policy recommendations. We do not view the two approaches as being concurrent, i.e., the question is not whether or not growth is exogenous or endogenous in the long run. By treating growth as an exogenous factor, the neo-classical growth approach focuses on convergence to steady states. Thus, the analysis of convergence of regional economies that focuses exclusively on the neo-classical growth model will suffer from reductionism since the approach can explain neither growth nor the location of economic activities. For example, if either a slow convergence pattern is observed, or convergence is not observed, the only diagnostic the neo-classical growth framework can provide is that some of its assumptions are not met. The role of public policies is extremely limited and the usual policy recommendations is that government interventions should not impede market adjustments. Even though the conclusion is a sound one, it still does not explain much about the relative growth patterns of regional economies.

On the other hand, the purpose of new growth theory is to explain the growth process in the long run by modelling it as an endogeneous phenomenon. The key features of new growth models are imperfect competition, increasing returns and externalities. Krugman (1991) in the following statement points out the importance of these features that are particularly relevant to the study of regional economy:

> *Essentially, to say anything useful or interesting about the location of economic activity in space, it is necessary to get away from the constant-returns, perfect-competition approach that still dominates most economic analysis*"

New growth and trade theories that focus on imperfect competition and scale economies provide a framework to understand the evolution of regional disparities that is

closely related to those that come out of structural theories such as the Staple approach of Innis (1930) and the Growth pole approach of Perroux (1955) and Myrdal (1957)[4]. The main features of the framework are the following:

1 Production technology in the manufactured sector is characterized with increasing returns. This leads to imperfect competition.

2 Because of point 1, the production of manufactured goods for which transportation costs are relatively small will tend to concentrate locally in the core, closer to the markets (for goods, labours and capital), where most the population of the economy live (Krugman, 1991). On the other hand, if transportation costs are sufficiently high outweighing the benefits of locating in the core, then the goods are likely to be produced in both regions.

3 In the periphery, economic activities will mainly concentrate on the exploitation of natural resources, the production of manufactured good which are too expensive to transport from the core (housing materials being the best example), the production of goods characterized by constant returns to scale, and the service industry. The economic structure of the core and the periphery are then necessarily distinct (Krugman 1991).

4 Following Lucas (1988), one can see the accumulation of human capital as being one of the motor of the growth process. Contrary to physical capital accumulation, he points out that human capital should not be constrained by decreasing returns but rather it should contribute to production technology with constant returns (on an inter-generational basis, the education system being technology for storing human capital). The feature of constant returns to education implies that its accumulation can potentially explain constant growth rate contrary to physical capital. Learning by doing is one of the technology that allows human capital to accumulate. The potential for learning by doing is not the same for the production of all goods and the

4. See Coulombe and Lee (1993).

exploitation of natural resources. The potential is much greater for the production of high-tech goods and few learning by doing might come out of fishery. Since the regions are specialized in the production of different goods, their growth patterns might differ.

5 The other model in Lucas (1988) might well be relevant for the understanding of the Canadian situation. Along the line of point 4 on the critical influence of human capital accumulation, Lucas analyses the incidence of the introduction of human capital as the third factor in the production function. Human capital generates a Marshallian externality at the regional/city level that makes all factors of production more productive when the total stock of human capital increases.

The preceding framework is not intended to be completed. Its purpose is to illustrate the richness of those new growth models and their capacity to help understand the evolution of economies. For the Canadian case, this framework suggests that economic convergence between the rich and the poor regions, between the core and the periphery, is not a simple mechanism which is the natural outcome of economic integration. In the empirical part of this paper, we will try to understand the growth pattern at the regional level in Canada by comparing convergence patterns of output, income, and productivity. We will come back to the preceding framework in the conclusion.

2. Methodology

The empirical part of this paper is an extension of Coulombe and Lee (1993). Following Barro and Sala-i-Martin (1991, 1992a, 1992b) methodology, we use two different concepts of convergence. The first one, called β-convergence, refers to the speed of convergence of the poor region to the level of the rich one. The second concept referred to σ-convergence, is measured by the level of dispersion of economic indicators between the poor and the rich region.

In a neo-classical framework, convergence between economies is modelled as a transitional dynamics toward steady state. If two economies have relatively similar technological, preference, and demographic and natural resource endowments, the key prediction of this framework is then that the economy with the lower initial level of output per capita will grow faster during the transition to steady-state. In this case, the β coefficient is referred to as measuring unconditional convergence, i.e., the speed of convergence is not conditional on observed differences in other exogenous parameters. This convergence hypothesis is usually tested using cross-sectional data. Simple cross-section tests will not be very reliable for Canada due to a small number of Canadian provinces. Following the procedure established in Coulombe and Lee (1993), we extend the number of observations through the use of pooled cross-section time series data. Provincial series from 1968 to 1992 were divided into three sub-periods to form three annual growth rates (1968-1976, 1976-1984, 1984-1992). In order to extract the decreasing growth rate trend at the national level, we regress the annual growth rate relative to the Canadian average on the initial level of output relative to the Canadian average for each of the three sub-periods as shown in equation (1):

$$\frac{1}{T-t} \cdot \ln\left(\frac{y_{i,T}/\,\bar{y}_T}{y_{it}/\,\bar{y}_t}\right) = B - \left(\frac{1 - e^{-\beta(T-t)}}{T-t}\right) \cdot \ln\left(\frac{y_{it}}{\bar{y}_t}\right) + u_{it} \qquad (1)$$

$$\textit{where } i = 1, \ldots, 10;\ t = 1968, 1976, 1984$$
$$T = 1976, 1984, 1992.$$

where i refers to the regional unit, y is output per capita[5], B, a constant term across economic units, u an error term, and t and T are initial and final years respectively. $\bar{y}$ refers to the weighted (by population) Canadian average. The higher β, the faster the poor regional units converge to the level of the rich one.

Barro and Sala-i-Martin (1991, 1992a) showed that the catch-up process (β-convergence) works to reduce the cross-sectional dispersion of per capita output, as long as it

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5. For an illustrative purpose, y is referred to as output per capita, but it can also refer to other variables such as output per worker or output per hours worked or any other income measurements.

is not offset by increased exogenous disturbances in the economy. The concept of σ-convergence refers to a decrease through time in the cross-regional dispersion of per capita output. This σ-convergence can be measured in several different ways. Barro and Sala-i-Martin (1991, 1992a, 1992b) use the standard deviation of log per capita output. We chose the more commonly used measurement, the coefficient of variation.[6] It is defined as:

$$V_{stwt} = \frac{\sqrt{\left(\sum_{i=1}^{10} (y_{i,t} - \bar{y}_t)^2\right)}}{\bar{y}_t} \qquad (2)$$

Finally, real regional per capita output (Y/N_P) differentials can be viewed as the product of three variables: labour productivity (GDP per hours worked); average hours worked per person (N_{AH}); and the ratio of actual number of workers to the population (N_W/N_P). This relationship can be further decomposed into the following:[7]

$$\frac{Y}{N_P} = \frac{Y}{N_H} \cdot N_{AH}\mu\Phi \cdot (1-u) \qquad (3)$$

where μ is the proportion of working age; ϕ is the participation rate; and u is the unemployment rate. Thus regional variations in per capita output/income depend on differentials in all these variables.

3. Data

The two basic national income concepts used in this paper are gross provincial product at factor cost (GPP) and earned income (EI). Each is divided by population, the number of workers and hours worked to measure per capita output/income and labour productivity as

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6. Using different indicators does not change the basic results.

7. The labour force is the population multiplied by the proportion of working age, μ, multiplied by the labour participation rate, ϕ: $L_F = N_P\mu\phi$. Total employment equals the labour force multiplied by the employment rate: $N_W = L_F(1 - u)$, where u = unemployment rate. Total person hours worked is total employment multiplied by average hours worked per worker: $N_H = N_W N_{AH}$. Therefore, total population is expressed by the following: $N_P = N_H/(N_{AH}\mu\phi(1 - u))$.

shown in Table 3.1. All per capita output/income and labour productivity are deflated by provincial price indexes. Results based on a national index are presented in Appendix B.

Table 3.1 Per Capita Output/Incomes and Labour Productivity

Mnemonics	Descriptions
GPP/POP	Gross provincial product at factor cost per capita
GPP/WR	Gross provincial product at factor cost per worker
GPP/HR	Gross provincial product at factor cost per hour
EI/POP	Earned income per capita
EI/WR	Earned income per worker
EI/HR	Earned income per hour worked

4. Results

4.1. β-convergence for Canada

Figures 4.1 and 4.2 plot the average annual growth rate of GPP/POP against the initial and final levels of GPP/POP respectively. In the first figure, an inverse relationship between the average annual growth rate and the initial level of GPP/POP emerges suggesting that there is convergence. In the second figure, this relationship becomes stronger indicating that the ten provinces have converged much more in 1992 compared to 1966. This convergence process becomes more evident in EI/HR as shown in Figures 4.3 and 4.4.

Table 4.1 presents the estimates of β (based on equation (1)) for per capita output/income and labour productivity and their corresponding half-life based on a sample of 10 cross-section and 3 time series as discussed in Section 2.1. We cannot reject convergence at the 5 % level for all six variables.

FIGURE 4.1 Growth versus Initial GPP per capita: 1966-1992

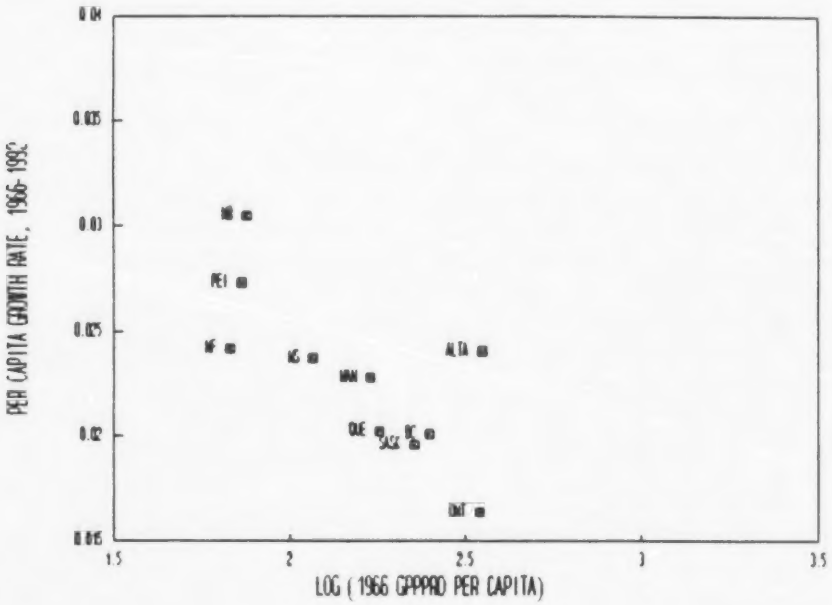

FIGURE 4.2 Growth versus Terminal GPP per capita: 1966-1992

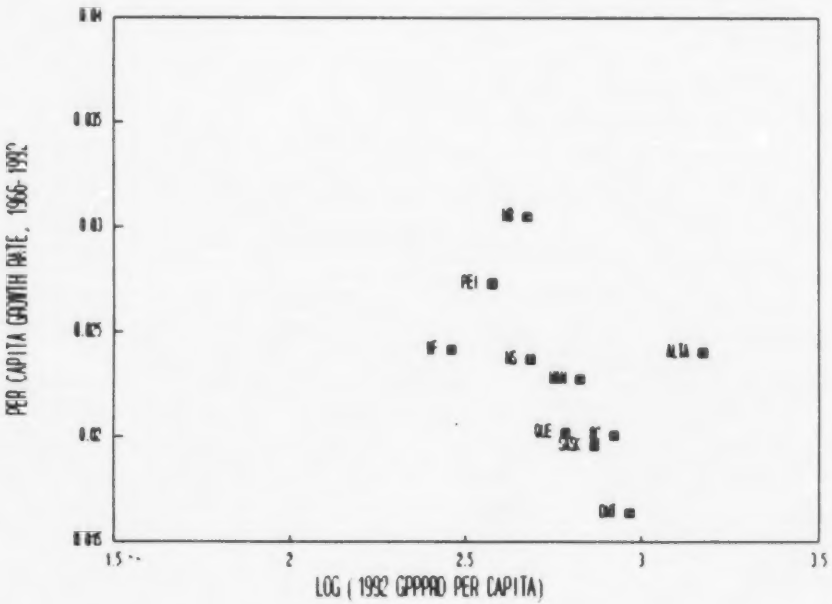

FIGURE 4.3 Growth versus Initial EI per hours worked: 1966-1992

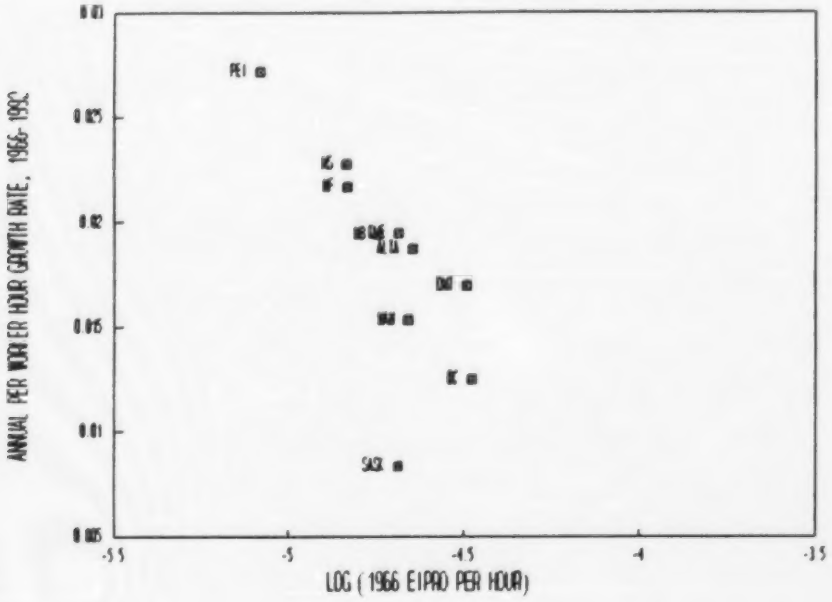

FIGURE 4.4 Growth versus Terminal EI per hours worked: 1966-1992

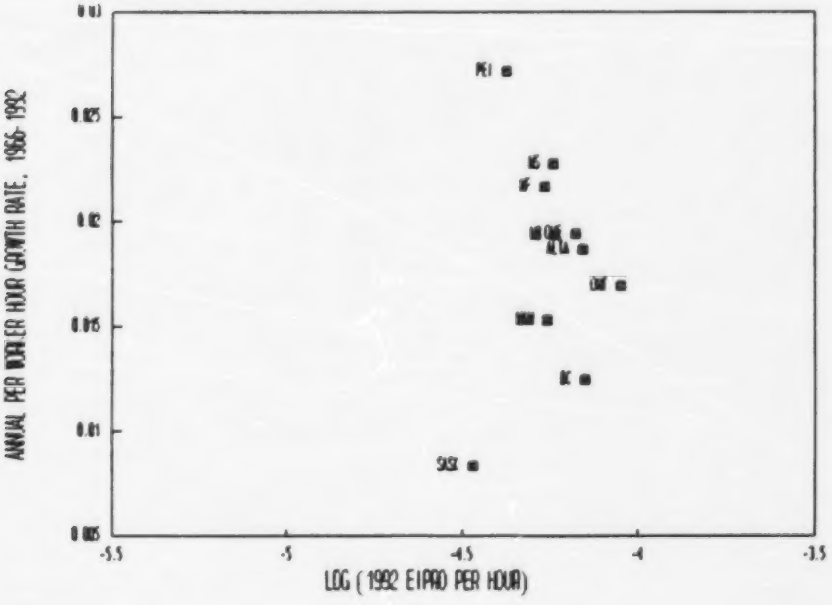

TABLE 4.1 Convergence in Canada: 1968-1992

(Based on Provincial Deflators)

Variables	β	R^2	Half-life (years)
GPP/POP	0.0126	0.24	55
	(2.940)		
GPP/WR	0.0173	0.23	40
	(2.795)		
GPP/HR	0.0245	0.40	28
	(4.007)		
EI/POP	0.0206	0.18	34
	(2.355)		
EI/WR	0.0427	0.22	16
	(2.421)		
EI/HR	0.0465	0.31	15
	(3.033)		

Note: Numbers in parentheses are t statistics. Earned income series are adjusted using Finance's cost of living index. The cost of living index, however, does not have a significant effect on the estimated coefficients.

For both GPP and EI, convergence is slowest on a per capita basis.[8] It becomes faster when they are adjusted for the differences in the proportion of working age, the labour force participation rate and the unemployment rate. The length of half-life[9] is reduced from 55 to 40 years for GPP and from 34 to 16 years for EI. When these are further adjusted for the differences in average hours worked per worker, the speed of convergence becomes faster for both GPP and EI. Thus, we have the fastest convergence in labour productivity in terms of

8. The faster convergence in EI compared to GPP is discussed in Coulombe and Lee (1993).

9. This refers to the number of years it takes to reduce the initial gap between the poor and the rich region by half.

hours worked and the slowest convergence in per capita income/output.[10] These results suggest that slow convergence in living standards (as measured by per capita output/income) is not due to slow convergence in competitiveness (as measured by labour productivity) but due to other factors such as slow adjustments in labour markets[11] or different industrial structure in different regions of Canada. This will be discussed further in the next section.

4.2. The Dispersion of Per Capita Output/Income and Productivity Levels

Figures 4.5 and 4.6 display the evolution GPP and EI dispersion (coefficient of variation) respectively. Both figures show that the levels dispersion of output and income per capita decreases once they are adjusted for differences in the proportion of working age, the labour force participation rate and the unemployment rate (the dispersion levels of GPP/WR and EI/WR are lower than those of GPP/POP and EI/POP). But adjusting for differences in average hours worked per worker do not make a significant difference.[12] As shown in Figure 4.5, the dispersion of output per capita and labour productivity fall steadily over the period 1966 to 1992. Comparing this to Figure 4.6 shows that all three measures of EI dispersion are more volatile than those of GPP. Moreover, contrary to GPP measures, a declining trend reverses in 1986 when the dispersion is measured by EI. This reversal is caused by a decline in EI in the prairie region (particularly Saskatchewan) since 1986 and an upward trend of Ontario's EI that started in 1982.

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10. As shown in Table A.1 in Appendix A, deflating by a national price index does not change basic findings. But since these estimates include the effects of the terms of trade, they are much more sensitive to changes in world resource prices.

11. Norcliffe (1988) emphasizes the role of regional industrial structure on regional labour market adjustments based on his analysis of the 1981-1984 period.

12. Figures A.1 and A.2 show the dispersion when income and output variables are adjusted by a national price deflator. As shown in Figure A.1, GPP series become much more volatile when they are adjusted by the national GDP deflator since the series reflect changes in the terms of trade (mainly reflect oil price shocks) in addition to changes in real output.

FIGURE 4.5 Coefficient of Variation of GPP: 1966-1992 (Provincial GDP Deflator)

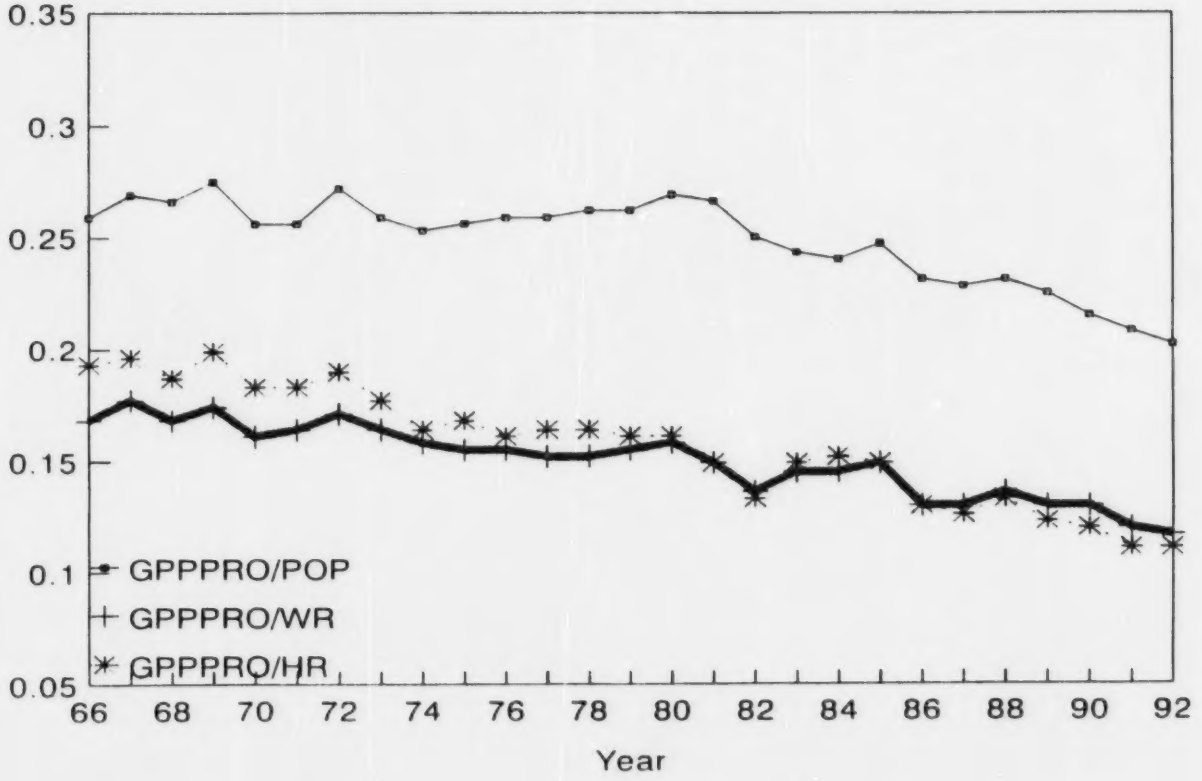
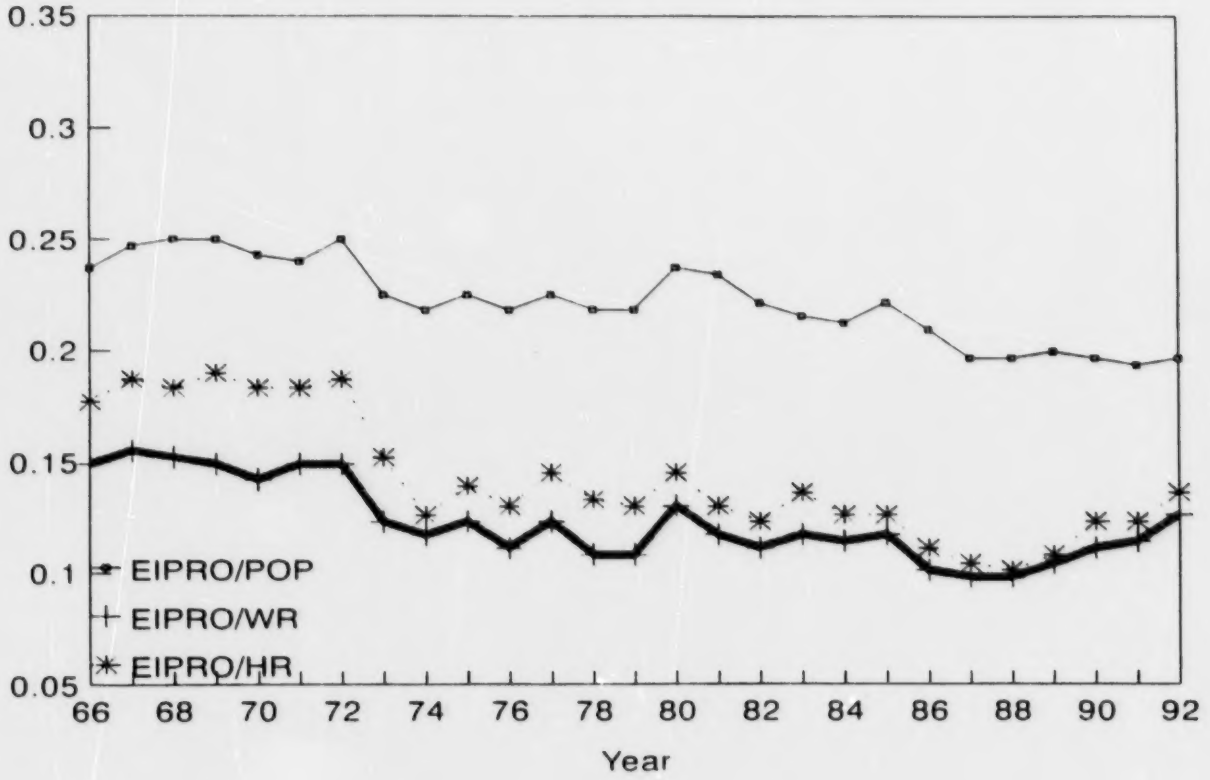


FIGURE 4.6 Coefficient of Variation of Earned Income: 1966-1992 (Provincial CPIs)



Results so far indicates that the convergence speed is slower on a per capita basis than on a per worker or a per hour basis. At the same time, the levels of dispersion is higher on a per capita basis than on a per worker or a per hour basis. As mentioned earlier, this appears to be the result of slow labour market adjustments. Figure 4.7 shows the evolution of the coefficients of variation of a number of different labour market indicators. These indicators are chosen based on equation (3) to distinguish between per capita output/income and per hour output/income. The dispersion of the proportion of working age, the participation rate and average hours worked all declined. On the other hand, the coefficient of variation of regional unemployment rates shows no obvious trend.[13] Furthermore, the relative dispersion of unemployment is five to ten times greater than other labour market variables. In this sense regional disparities in unemployment rates appear to be the most significant factor in slowing down regional labour market adjustments. Thus, regional disparities in unemployment rates appears to impede convergence in living standards across Canada.

5. Conclusion

This paper has contributed to established some stylized facts on the convergence of growth patterns at the regional level in Canada. These stylized facts are:

R1 Since 1966, there is evidence of convergence in living standards and labour productivity.

R2 The speed of GPP convergence is slower than EI convergence.

R3 The speed of convergence for both GPP and EI increases as we move from a per capita basis to a per worker basis, and from a per worker basis to a per hour basis.

R4 The speed of GPP convergence increases once the terms of trade effect is included.

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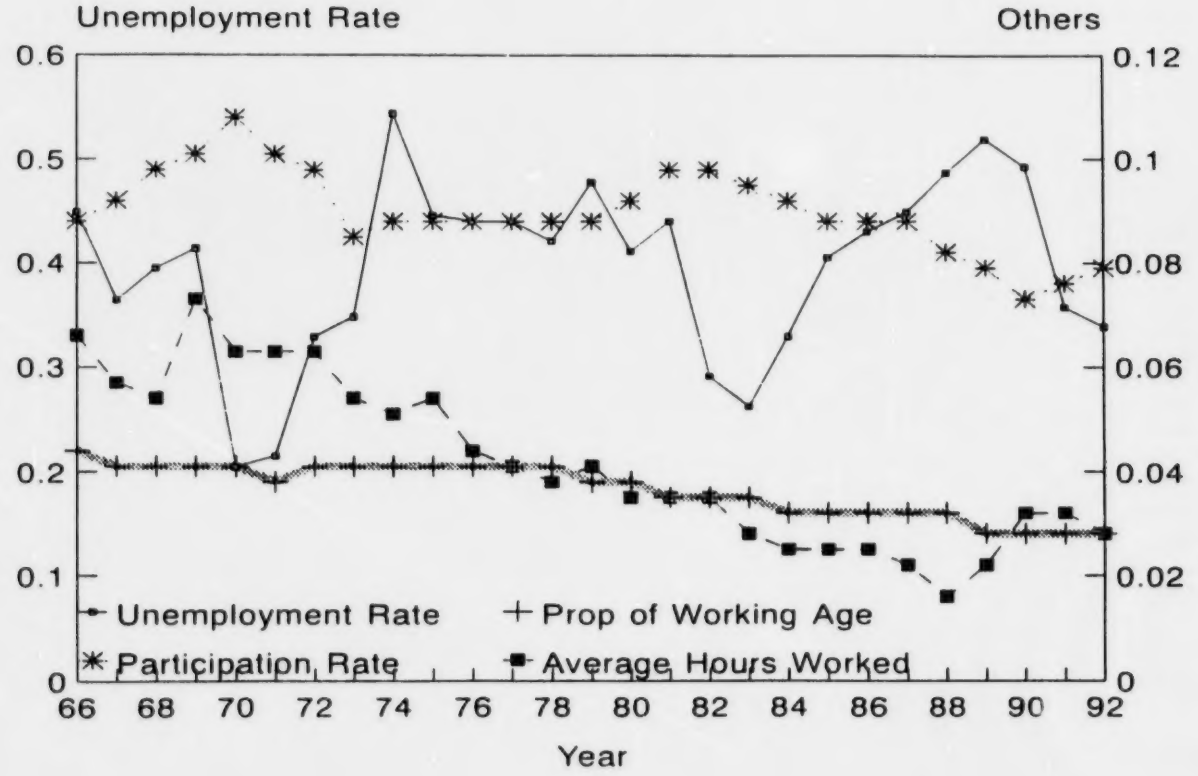
13. However, a measure of absolute dispersion as indicated by the standard deviation of regional unemployment rates has been rising over time.

FIGURE 4.7 Coefficient of Variation of Labour Market Variables: 1966-1992



R5 The relative dispersion of GPP and EI on a per capita basis is higher than those on a per worker or on a per hour basis.

These stylized facts can be synthesized in the following proposition:

- Slow adjustment in the labour market accounts for the relative slow convergence in regional disparities in living standards in Canada. The convergence in labour productivity is relatively fast.

This leads to the following hints for policy prescriptions:

C1 From an endogenous growth framework, one can fear that the regional specialization that comes from the closed economic integration would provide relatively poor growth prospects for the periphery. When we look at the relative growth patterns of labour productivity in Canada since the 1960s, we conclude that the working of market adjustment has instead produced a relatively fast convergence in regional productivity in Canada.

C2 The key to reduce regional disparities in regional living standards in Canada is to reduce regional disparities in unemployment rates. There are many possible solutions for this. Following our conclusion C1, we think the best way to do it is to facilitate adjustments in the labour market by eliminating regional distortions such as regionally extended unemployment benefits and the perverse subsidy to seasonable employment that comes out of the UI system.

Appendix A: Convergence Results based on National Price Indexes

Table A.1 presents the estimates of β using national price indexes. Qualitative results are not significantly different from those in Table 4.1.

TABLE A.1 Convergence in Canada: 1968-1992
(Based on National Deflators)

Variables	β	R^2	Half-life (years)
GPPNAT/POP	0.0195	0.18	36
	(2.445)		
GPPNAT/WR	0.0302	0.20	23
	(2.413)		
GPPNAT/HR	0.0379	0.27	18
	(2.855)		
EINAT/POP	0.0195	0.18	36
	(2.336)		
EINAT/WR	0.0299	0.13	23
	(1.979)		
EINAT/HR	0.0336	0.21	21
	(2.432)		

Note: Numbers in parentheses are t statistics.

Figures A.1 and A.2 show the dispersion of GPP and EI using national price indexes. The abnormal behaviour in Figure A.1 for the 1974-1986 period where the coefficients of variation increased beginning in 1974 and drastically dropped in 1986 was essentially driven from Alberta and to a lesser extent by Saskatchewan where their GPP increased dramatically in the late 1970s and declined in 1986 due to the rise and the subsequent decline of oil prices.

FIGURE A.1 Coefficient of Variation of GPP: 1966-1992 (National GDP Deflator)

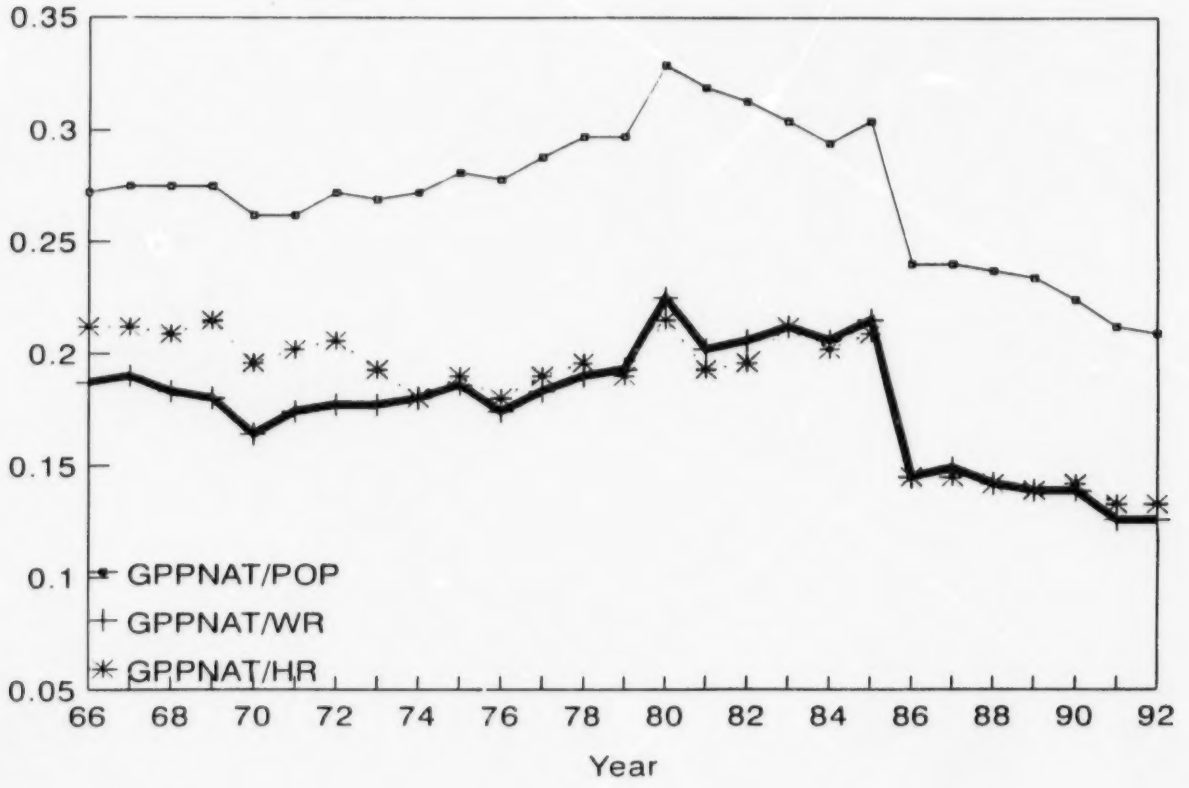
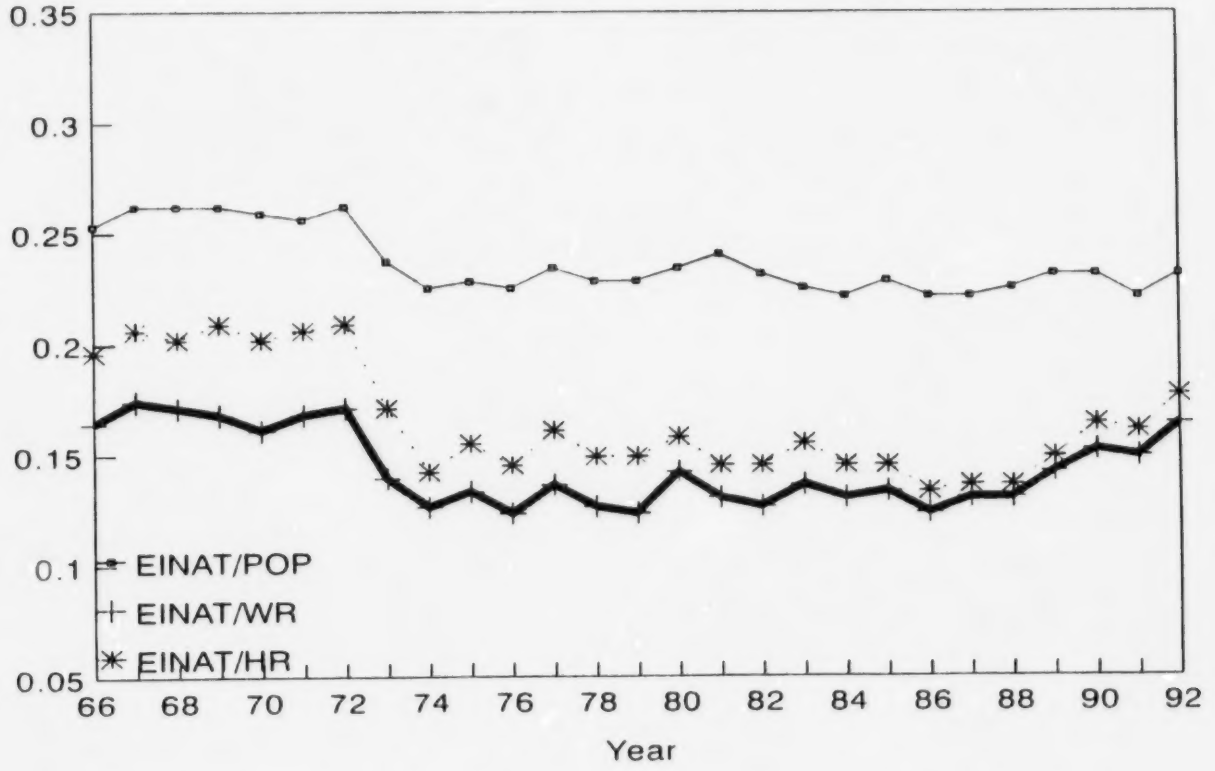


FIGURE A.2 Coefficient of Variation of Earned Income: 1966-1992 (National CPIs)



Appendix B: Data Sources

List of Variables and Parameters

Variables	Periods	(Source)
Labour Force 15 years and over	1966-1992	(CANSIM: D768790, D769856, D768613, D770071, D769838, D769901, D769945, D769966, D769987, D769919, D767870)
Employment 15 years and over	1966-1992	(CANSIM: D768890, D769857, D768616, D769890, D769839, D769902, D769946, D769967, D769988, D769920, D767888)
Unemployment Rate 15 years and over	1966-1992	(CANSIM: D768914, D769861, D768752, D769893, D769842, D769905, D769949, D769970, D769991, D769923, D767863)
Participation Rate 15 years and over	1966-1992	(CANSIM: D768911, D769860, D768623, D769892, D769841, D769904, D769948, D769969, D769990, D769922, D767860)
Population 15 years and over	1966-1992	(CANSIM: D768787, D769855, D768606, D769889, D769837, D769900, D769944, D769965, D769986, D769918, D767867)
Total Population	1966-1992	(CANSIM: D44967, D44988, D45009, D45030, D45051, D45072, D45093, D45114, D45135, D45156, D44946)
Total Hours Worked 15 years and over	1966-1975	(Statistics Canada Unpublished Data)
	1975-1988	(Statistics Canada

		Cat. No. 71-529)
	1989-1992	(Statistics Canada Cat. No. 71-220)
Gross Provincial Product at Market Price	1966-1992	(CANSIM: D31544, D31558, D31572, D31586, D31600, D31614, D31628, D31642, D31656, D44000, D31530)
Indirect Taxes Net Subsidies	1966-1992	(CANSIM: D12547, D12549, D12551, D12553, D12555, D12557, D12559, D12561, D12563, D12565, D20008)
Gross Provincial Product at Factor Cost	1966-1992	(Calculated using CANSIM Data)
GDP Deflators		
for provinces	1966-1992	(Conference Board)
for Canada	1966-1992	(CANSIM: D20556)
Wages and Salaries and SLI	1966-1992	(CANSIM: D11739-D11748)
Farm Income	1966-1992	(CANSIM: D11752-D11762)
Unincorporated Non-farm Net Income	1966-1992	(CANSIM: D11764-D11773)
Earned Income	1966-1992	(Calculated using CANSIM Data)
CPI		
for provinces	1966-1992	(Conference Board)
for Canada	1966-1992	(CANSIM: D484000)
Cost of Living Index	1986	(Létourneau)

Definitions of Variables

GPP at Factor Cost = GPP at Market Price - Indirect Taxes net of subsidies

Earned Income = GPP at Factor Cost - PROF - INT - IVA - CCA
where, PROF = Corporate profits before taxes;
INT = Interest and miscellaneous investment income
IVA = Inventory valuation adjustment;
CCA = Capital consumption allowance

and Earned Income = WSSLI + FARM + UNINC,
where, WSSLI = Wages, salaries and supplementary labour income;
FARM = Accrued net income of farm operators from farm production;
UNINC = Net income of non-farm operators from farm production.

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